



Three New Species of the Genus *Tisis* Walker from Malaysia (Sarawak), with Notes on Some Little Known Species (Lepidoptera: Lecithoceridae)

Kyu-Tek Park

Center for Insect Systematics, Kangwon National University, Chuncheon,
200-701 Korea. Tel: 82-33-250-6433. Fax: 82-33-256-2085.
E-mail: cispa@kangwon.ac.kr

Abstract Three species of the genus *Tisis* are newly described from Sarawak, Malaysia: *T. amabilis* sp. nov., *T. sabahensis* sp. nov., and *yasudai* sp. nov.. *T. luteella* (Snellen) is reported for the first time from Sarawak. Taxonomical notes on some little known species are given, with illustrations of their adult images. Illustrations of the genitalia of the new species and the newly reported species from Sarawak are provided.

Key words Systematics, *amabilis* sp. nov., *sabahensis* sp. nov., *yasudai* sp. nov., *luteella*

INTRODUCTION

Since the type-species of the genus *Tisis* Walker, *T. bicolorella* Walker, 1864, was described from Sarawak, 12 species were been known from either Sarawak or Sabah, Malaysia by Walker (1864) and Meyrick (1910, 1926). Among these known species, Clarke (1965) illustrated the male or female genitalia of the six Malaysian species. Wu (1998) described an additional species, *T. sandaradema* Wu from Sarawak, and illustrated the male or female genitalia of six Malaysian species. Robinson *et al.* (1994) presented adult illustrations of four species, including *charadraea* Meyrick, 1910, which was described from Malay peninsula. However, adult images of the other four species, viz., *T. bicolorella* Walker, *cerambycina* Meyrick, 1926, *polemarcha* Meyrick, 1926, and *polychlora* Meyrick, 1926, have not been presented since they were described. According to Mr. K. Tuck (*pers. comm.*), the Natural History Museum, London, type-specimens of these four species are not in the museum and are presumed to be missing. Dr. F. Abang, University Malaysia Sarawak, has also informed me that there are no types of these species in the Sarawak Museum. In this article, among the above four previously known species, three species are illustrated here for the first time, except *T. cerambycina* Meyrick, which its type specimen is not available. According to the original description, because of its similarity to *T. bicolorella* Walker, *T. cerambycina* can be distinguished from the new species described in this paper.

MATERIALS AND METHODS

Materials examined in this study were mainly collected by T. Yasuda (1981) in Sarawak, Malaysia. They are presently preserved in the Entomological Laboratory, Univeristy of Osaka

Prefecture (UOP), Japan. A part of material was based on the collection of the United State National Museum (USNM), Washington D.C., USA. The color standard for the description of the adult wing pattern is based on "Methuen Handbook of Colour" by Kornerup and Wanscher (1978).

TAXONOMIC ACCOUNTS

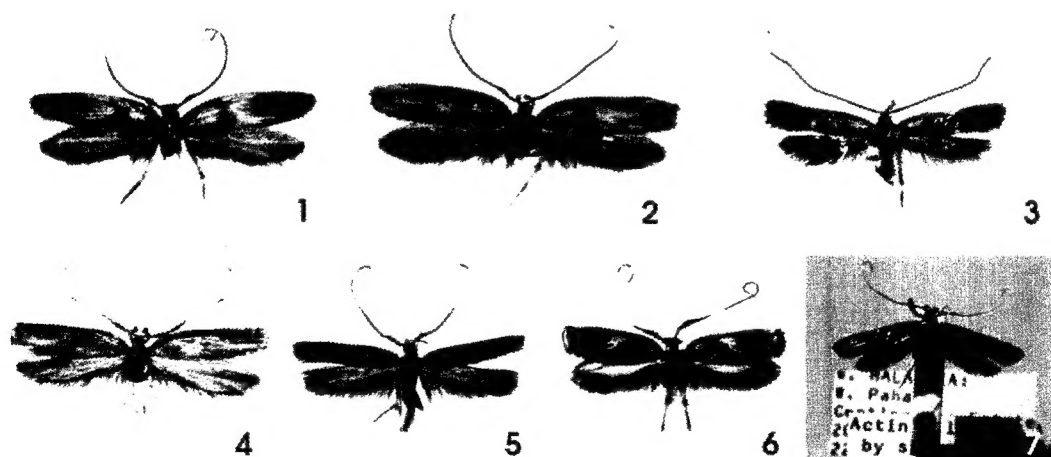
Tisis amabilis sp. nov.

(Figs. 1, 8a-b, 13, 13a)

Diagnosis. This species is barely distinguishable from *T. argyrophaea* Meyrick, which was described from Kuching in the southern part of Sarawak. This is based on a female, but the characteristics of the male and female genitalia of this species differ from those of the latter.

Description. Male. Wingspan, 22 mm. Head, tegula, thorax yellowish brown dorsally. Pedicel of antenna grayish brown, elongate, thicker near apex; flagellum dilated, elliptical, concave dorsally near base, dark brown before 1/4 and at apical 1/10, creamy white between them. First segment of labial palpus relatively long, about 1/3 of 2nd; 2nd segment long with dark brown scales appressed, recurved; 3rd segment concealed in scales of 2nd. Forewing oblong, elongate; ground color light orange, with transverse dark brown, leaden-metallic band from 2/5 of costa, connecting to costal streak from base; golden yellow zone well represented before and beyond this band; dark brown, leaden-metallic zone presented beyond 3/5; apex obtuse; termen oblique; fringes dark brown; R_3 free from R_{4+5} ; R_4 and R_5 stalked 2/3, R_5 to apex as same as the type species (*bicolorella* Meyrick); M_1 almost straight to R_{4+5} ; M_2 , M_3 , CuA_1 coincident; CuA_2 arising from near lower angle of cell. Hindwing trapezoidal, with hair like scales on fold; M_2 and, M_3 stalked before 1/2 of wing; M_3 and CuA_1 stalked before middle; CuA_2 arising before 1/3 of wing.

Female. Wingspan, 19–20 mm. Head, tegula, thorax dark brown. Flagellum dark brown before basal 3/4 and beyond 1/6 apically. Second segment of labial palpus slender, grayish bro-



Figs. 1–7. Adults. 1. *Tisis amabilis* sp. nov.; 2. *T. sabahensis* sp. nov.; 3. *T. yasudai* sp. nov.; 4. *T. luteella* (Snellen); 5. *T. bicoloraella* Walker; 6. *T. polemarcha* Meyrick; 7. *T. polychlora* Meyrick (Figs. 7. copyright of the Trustees of the BMNH, used with permission).

wn; 3rd shorter than 2nd. Forewing without light orange fascia along costa beyond dark brown fascia; venation similar to that of male. Hindwing venation with M_2 and M_3 stalked beyond $1/2$ of wing; M_3 and CuA_1 separated beyond middle of stalk; CuA_2 arising near $2/5$ of wing. Hind tibia with light orange, long hair like scales around.

Male genitalia (Figs. 8, 8a–b). Uncus rudimental. Gnathos relatively short, heavily sclerotized, almost straight beyond basal $1/3$, except preapical part. Valva shoe-shaped; outer margin slightly concave, densely setose along margin, lower angle of distal part strongly developed; crescentic concave area well presented medially, with a small protrusion near base on ventral margin; sacculus weakly presented. Juxta with heavily sclerotized, sword-shaped, long lateral lobes. Aedeagus shorter than valva, almost straight.

Female genitalia (Figs. 13, 13a). Eighth sternite moderate. Antrum short, broad, deeply concave on caudal margin. Ductus bursae broadened, as long as corpus bursae. Corpus bursae elongate; signum somewhat triangular, with small denticles along margin and strong spine like thorns at lateral corners.

Types. Holotype: ♂, Malaysia, Sabah, West Coast, Mamut, 14 Aug. 1981 (T. Yasuda), gen. prep. no. 4806/Park. Paratypes: 2 ♂, 1 ♀, same data as the holotype. gen. prep. no. 4810/Park (female); Types are deposited in the University of Osaka Prefecture (UOP), on an indefinite loan from Malaysia.

Distribution. Malaysia (Sabah).

Remark. The male genitalia of the holotype was compared with those of a male slide (no. USNM-89120) of *T. argyrophaea* Meyrick made by JFG Clarke in the Smithsonian Institution, and illustration by Wu (1998, Fig. 7).

Etymology. This specific name is derived from Latin, “*amabilis*” (= beauty), referring to the beautiful color pattern of the forewing.

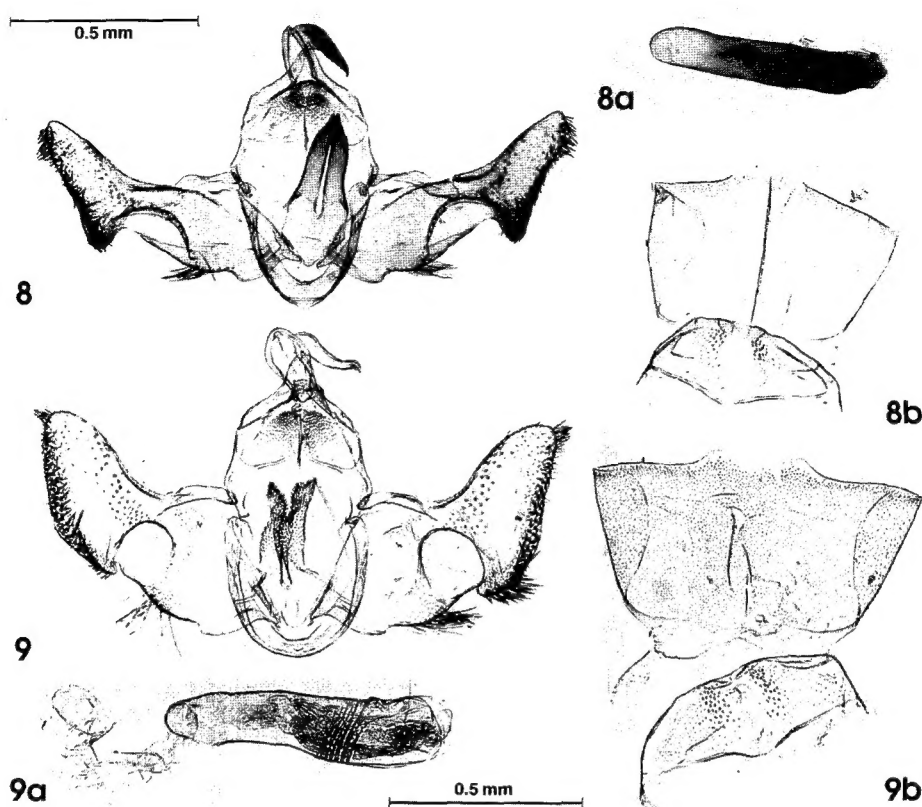
***Tisis sabahensis* sp. nov.**

(Figs. 3, 9, 9a–b)

Diagnosis. This species is one of the largest species of the genus and superficially similar to *T. amabilis* sp. nov., but can be separated by the notably larger size, lacking of the dark brown zone in the distal part of forewing, and the characteristics of the male genitalia, especially in the shape of the distal part of the valva (= cucullus), caudal margin of the juxta, and the shape of ostium in the female.

Description. Male. Wingspan, 26 mm. Head pale brownish yellow; tegula bronze; thorax pale brownish yellow. Pedicel of antenna dark brown, elongate, larger towards apex; flagellum dilated, elliptical, concave dorsally near base, dark brown except creamy white in preapical $1/6$. First segment of labial palpus shorter than $1/3$ of 2nd segment; 2nd segment slender, light orange with dark brown scales apically; 3rd segment short, visible. Forewing oblong, relatively broad; ground color light orange, with dark brown, leaden-metallic streak at base; medial zone dark brown, leaden-metallic band more or less crescent, starting from base, running along costa, and extending to lower margin of cell, followed by broad light-brown streak running to apex below costa; several light brown transverse lines along veins; fringes dark brown along termen, but golden yellow along inner margin; R_2 closer to upper angle of cell; R_3 stalked before middle, R_4 and R_5 separated from $3/4$, M_1 almost parallel to R_{4+5} . Hindwing trapezoidal; dense hair like long scales along fold. Hind tibia relatively slender, with light orange hair like scales medially. The female is unknown.

Male genitalia (Figs. 9, 9a–b). Gnathos moderate size, sclerotized, slightly concave medially. Valva relatively short; costa incurved; densely setose with short bristles along outer margin; semiovalate concave zone well presented medially; sacculus short, weakly presented. Juxta



Figs. 8-9. Male genitalia (a: aedeagus; b: 7th-8th segment). 8. *T. amabilis* sp. nov.; 9. *T. sabahensis* sp. nov. (Scale = 0.5 mm)

with weakly sclerotized, flap like caudal lobes bearing numerous spicules. Aedeagus stout, with a long sack of spicules, surrounded medially by wrinkled membrane, broadened apically.

Type. Holotype: ♂, Malaysia, Sabah, West coast, Mamut, 20 Aug. 1981 (T. Yasuda), gen. prep. no. 4807/Park. Type is in the UOP, on an indefinite loan from Malaysia.

Distribution. Malaysia (Sabah).

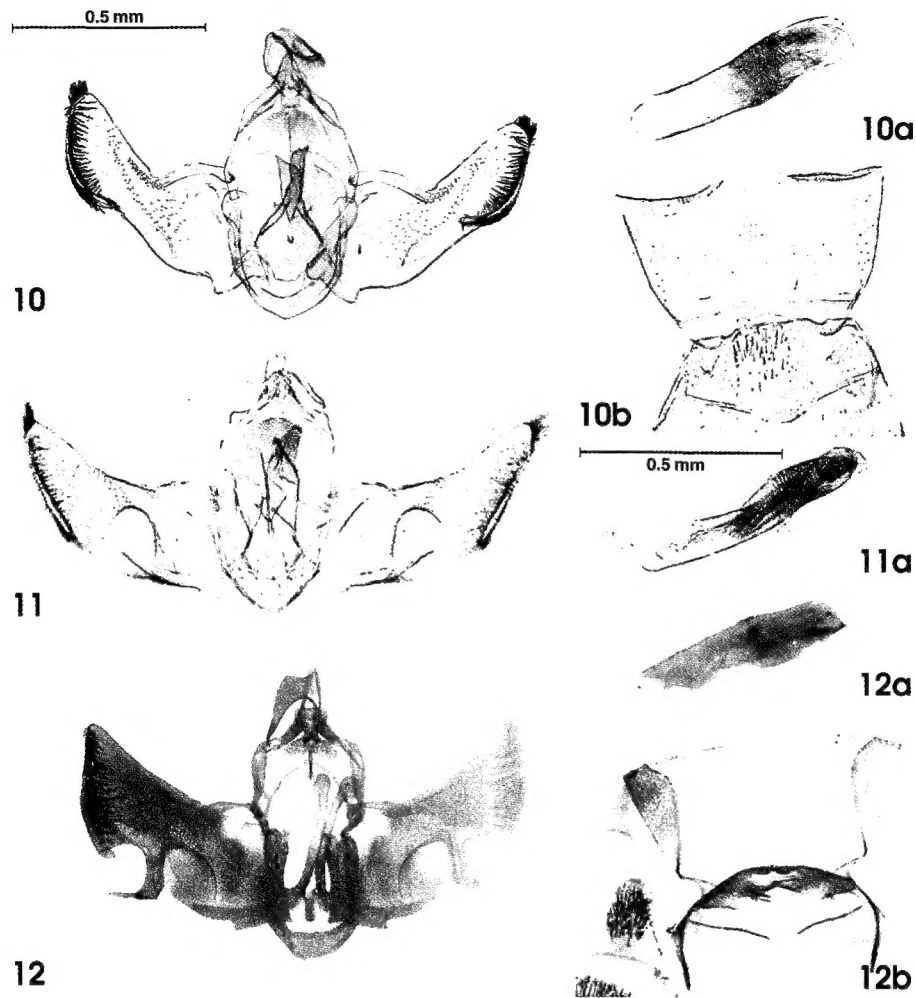
Etymology. This specific name refers to the type locality.

***Tisis yasudai* sp. nov.**

(Figs. 2, 10, 10a-b, 14, 14a)

Diagnosis. This species is similar to *T. eurylampis* Meyrick in the forewing shape, but can be easily differentiated by the golden yellow band on the middle of the forewing. The female genitalia is even more similar, but the antrum is broadened in the distal half.

Description. Male. Wingspan, 17.5 mm. Head, tegula, thorax golden brown to dark brown. Pedicel of antenna golden brown, elongate, larger towards apex; flagellum dilated, elliptical, concave dorsally near base, brownish orange throughout. First segment of labial palpus longer than 1/3 of 2nd; 2nd segment long, recurved, with dark brown terminal tuft of scales; 3rd segment concealed in scales of 2nd. Forewing oblong, relatively narrow; dark brown at base, gol-

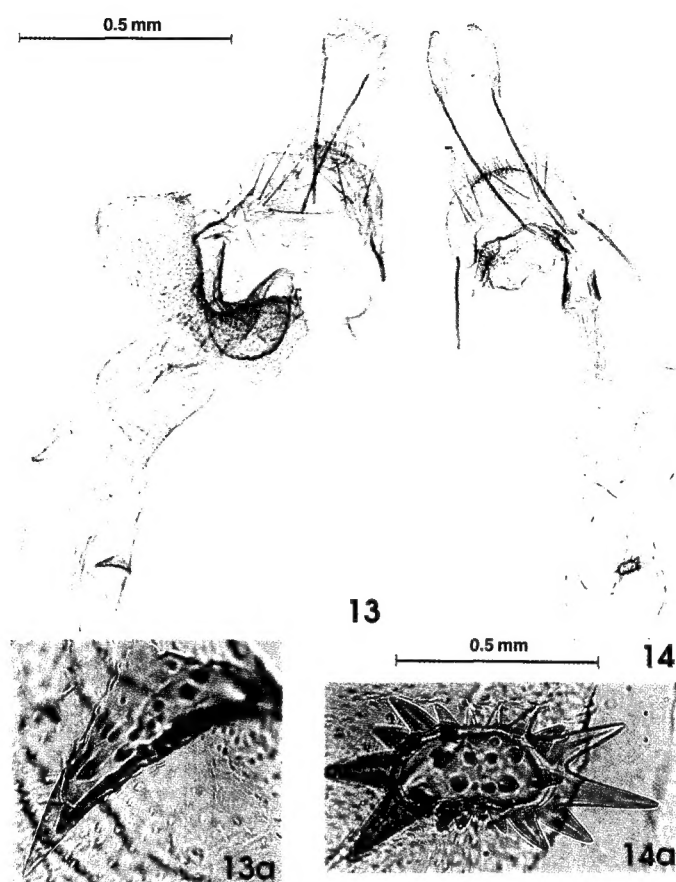


Figs. 10–12. Male genitalia (a: aedeagus; b: 7th–8th segment). 10. *T. yasudai* sp. nov.; 11. *T. luteella* (Snellen); 12. *T. polemarcha* Meyrick.

den yellow, broad transverse streak running to $1/4$, lower angle extended to near inner margin, and upper angle extending to apex along costa; median band golden yellow, almost straight vertically; apex obtuse; termen oblique; fringes concolorous; R_2 close to upper angle of cell; R_3 free from R_4 ; R_5 absent; M_1 almost straight. Hindwing gray, lanceolate, narrowed towards apex; apex somewhat acute; with dense hair like long scales along upper margin of cell and fold.

Female: Wingspan, 17–19 mm. Antenna golden brown before $5/6$ and apical $1/10$, between them creamy white. Second segment of labial palpus slender, golden yellow; 3rd segment as long as 2nd segment, dark brown ventrally. Forewing as same as that of male. Hindwing somewhat trapezoidal and gray.

Male genitalia (Figs. 10, 10a–b). Gnathos somewhat different from ordinary members of the genus: somewhat broadened, with comb like scales along lateral margins. Valva relatively



Figs. 13–14. Female genitalia. 13. *T. amabilis* sp. nov.; 13a. magnification of signum; 14. *T. yasudai* sp. nov.; 14a. magnification of signum.

narrow; costa strongly concave medially; distal part with dense short bristles along margin; apex round; ventral margin with strong protrusion near base; sacculus extended to middle. Juxta with asymmetrical caudal lobes: left one longer, narrow, caudal margin serrated; right one short, widened, with sharply acute apex. Aedeagus almost straight, as long as valva, with wrinkles on dorsal surface medially.

Female genitalia (Figs. 14, 14a). Eighth sternite somewhat round on caudal margin. Antrum narrow in distal half and broadened in anterior half, sclerotized laterally, as long as ductus bursae. Ductus bursae narrow; ductus seminalis broadened, arising from conjunction between ductus bursae and corpus bursae. Corpus bursae semiovate; signum asteroid, widened, 3 to 4 long, strong, horn like spines laterally.

Types. Holotype: ♂, Malaysia, Sabah, Tawau, Brumas, 23 July 1981 (T. Yasuda), gen. prep. no. 4809/Park. Paratypes: 2 ♀, Sabah, Sandakan, Sepilok, 7 Aug. 1981, gen. prep. no. 4825/Park; 1 ♀, Sabah, West coast, Mamut, 14 Aug. 1981 (T. Yasuda). Types are deposited in the UOP, on an indefinite loan from Malaysia.

Distribution. Malaysia (Sarawak).

Etymology. The specific name refers to the collector, Japanese Lepidopterist, Professor T.

Yasuda.

***Tisis luteella* Snellen, 1903**

(Figs. 4, 11, 11a)

Tisis luteella Snellen, 1903. Tijds. Ent. 46: 50; Wu, 1998: 192. Type locality: Java, Indonesia.

Remark. Wingspan, 24 mm. The distal flap of the right caudal lobe of juxta in the male genitalia is more or less variable, compared to the species from Pulau Laut I. SE Borneo, Doherty, which was prepared by Wu (slide no. 89258 in USNM). This species is reported for the first time from Sabah. The adult, male and female genitalia were illustrated by Wu (1988, Figs. 8, 9).

Material examined. 1 ♂, Malaysia, Sabah, Tawau, Brumas, 23 July 1981 (T. Yasuda), gen. prep. no. 4831/Park.

***Tisis bicolorella* Walker, 1864**

(Fig. 5)

Tisis bicolorella Walker, 1864. List Lep. Het. Brit. Mus. 29: 793; Meyrick, 1925: 204; Wu, 1998: 194. Type locality: Sarawak, Malaysia.

Remark. Wingspan, 17–19 mm. This is the type species of the genus *Tisis* Walker. Male and female genitalia, based on specimens collected from Sarawak were illustrated by Wu (1998: 194, Figs. 3, 12). The adult image is illustrated here for the first time.

Material examined. 2 ♂, 1 ♀, Semergoh For Res. 15 mil. So Kuching, 13 Sept. 1966, gen. slide no. 88122, 88125, 88126/Clarke, in USNM.

***Tisis polemarcha* Meyrick, 1926**

(Figs. 6, 12, 12a–b)

Tisis polemarcha Meyrick, 1926. Sarawak Museum. J. 9: 155. Type locality: Sarawak.

Remark. Wingspan, 26 mm. This is one of the largest species of the genus *Tisis*. The type specimen is probably missing. Twelve comparative specimens from Sarawak are deposited in the Natural History Museum, London. Since its description, the adult image is presented here for the first time.

Material examined. 1 ♂, Sabah, Spelilok, near Sandakan, 14–24 Aug. 1988 (T. Kumata), gen. prep. no. 0668–Sugisima.

***Tisis polychlora* Meyrick, 1926**

(Fig. 7)

Tisis polychlora Meyrick, 1926. Sarawak Museum. J. 9: 155. Type locality: Sarawak.

Remark. Wingspan, 23 mm. The type is probably missing. Fifteen comparative specimens from W. Pathan are deposited in the Natural History Museum, London. Since its description, the adult image is presented here for the first time (copyright of the Trustees of the BMNH, used with permission).

Acknowledgments I wish to express my sincere appreciation to Dr. J. Brown, Smithsonian Institution, Washington D.C., USA, and Dr. T. Hirowatari, Entomological Laboratory, University of Osaka Prefecture, Japan, for their generous loan of specimens from their

collections. Also my thank is debt to Mr. K. Tuck, the Natural History Museum, London, UK for his allowance to use photo of a adult.

REFERENCES

- Clarke, J.F.G. 1965. Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History) described by Edward Meyrick 5: 1–255. London.
- Kornerup, A. and J.H. Wanscher. 1983. Methuen Handbook of Colour. Third ed. Methuen and Co. Ltd., London. 252pp.
- Meyrick, E. 1910. Description of Malayan Microlepidoptera. Trans. R. ent. Soc. Lond. 1910: 438–439. London.
- Meyrick, E. 1925. Family Gelechiidae. Lepidoptera Heterocera. In P Wytsman, ed. Genera Insectorum. 184pp. Bruxelles.
- Meyrick, E. 1926. Microlepidoptera from Northern Sarawak. Sarawak Mus. Jour. 9: 152–159.
- Park, K.T. 2001. A new species of the genus *Tisis* (Lepidoptera, Lecithoceridae) from Thailand. Korean Journ. Syst. Zool. 17(1): 59–63.
- Robinson, G.G., K.R. Tuck, and M. Shaffer. 1994. A field guide to the smaller moths of South–East Asia. 308pp. Kuala Lumpur. Malaysian Nature Society.
- Snellen, P.C.T. 1903. Beschrijvingen van nieuwe exotische Tortricinen, Tineinen, en Pterophorinen, benevens aantekeningen over reeds bekend gemaakte soorten. Tijds. Ent. 46: 41–50. Amsterdam.
- Walker, F. 1864. List of the specimens of the lepidopterous insects in the collection of the British Museum. 29: 793–798. London.
- Wu, C. 1998. Genus *Tisis* Walker from Malaysia and Indonesia (Lepidoptera, Lecithoceridae), with description of three new species. Zool. Stud. 37(3): 191–196.

(Received: October 17, 2002, Accepted: December 22, 2002)